

**Economic Benefits and Costs Associated with Substance Abuse
Treatment Provided to Indigent Clients through the Washington
State's Alcoholism and Drug Addiction Treatment
and Support Act (ADATSA) Program**

Prepared for

**Division of Alcohol and Substance Abuse
Department of Social and Health Services**

By

**Thomas Wickizer, Ph.D.
Associate Professor
University of Washington**

and

**Dario Longhi, Ph.D.
Senior Research Manager
Research and Data Analysis
Department of Social and Health Services**

November 25, 1997

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EXECUTIVE SUMMARY

Introduction

Substance abuse continues to claim wide attention as a serious societal problem, imposing enormous economic costs in the form of lost productivity, premature death, crime, and medical care use. In Washington alone, these economic costs were estimated at \$1.9 billion for 1990 (closer to \$2.4 billion if measured in current dollars).¹

In response to the problem of substance abuse, Washington, established an innovative program to provide support for the treatment of indigent, chemically dependent persons. Funded through the Alcoholism and Drug Addiction Treatment and Support Act (ADATSA) and administered by the Division of Alcohol and Substance Abuse (DASA), this program is intended to offer addicted indigent persons, unemployable because of chemical dependency, an alternative to public assistance.

The Office of Research and Data Analysis (ORDA) conducted a study for DASA, gathering detailed client information from selected state data bases to assess the effects of treatment on various outcomes, including employment, Medicaid costs, public assistance payments, and treatment reentry costs, and to examine the cost avoidance resulting from treatment. Because of its broad scope and complexity, the ORDA study was limited in its ability to examine any single outcome area in great detail.

The aim of the present study is to perform a secondary analysis of the ADATSA/ORDA data base to assess the cost savings of treatment in three areas: Medicaid costs, public assistance payments, and treatment reentry costs.

Methods

This study, like the previous ORDA study, utilized a quasi-experimental design. Its sample frame consisted of clients applying for treatment between August and November 1989. Clients who completed the full continuum of treatment or completed at least the primary phase of treatment were combined and included in the treatment group. The comparison group consisted of clients who were screened and judged eligible for ADATSA treatment, but who either did not begin treatment or began but dropped out prior to completing the initial phase.

¹ Wickizer TM, Wagner T, Adams A. "Economic Costs of Substance Abuse in Washington State," Division of Alcohol and Substance Abuse, Olympia, WA, 1994.

The treatment group consisted of 366 clients, the comparison group 354 clients. Excluded from the analysis were (1) a small number of clients who died during the study period and (2) clients on Supplemental Security Income (SSI). Most clients were referred to intensive inpatient treatment, which accounted for 234 of the 366 treatment-group clients. The remaining 132 clients received either outpatient treatment (64 clients) or other residential treatment (68 clients).

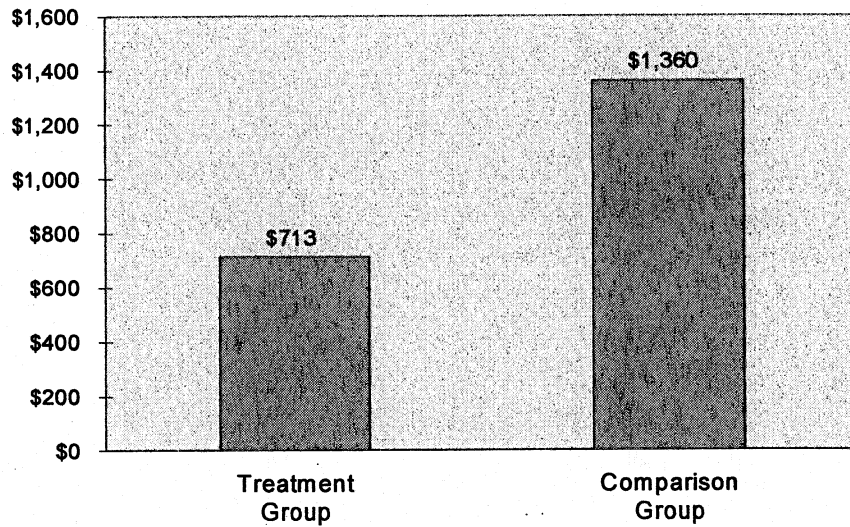
Cost savings were analyzed for a 12-month period following treatment. Medicaid costs included all inpatient and outpatient medical expenses, exclusive of Medicaid payments made for substance abuse treatment. Public assistance costs included all welfare payments made to clients during the 12-month follow-up period, including AFDC payments as well as payments for general assistance unemployable (GAU). Chemical treatment reentry costs represented expenditures for the following services: detox, inpatient treatment, and outpatient treatment.

The study relied on multiple regression analysis to estimate the cost savings of treatment. This statistical procedure allowed the analysis to estimate the effect of treatment on cost outcomes, controlling for variables such as age, age at first use, severity of dependence, mental health problems, gender, education, ethnic group, and prior admissions. In this way, it was possible to derive estimates for both the treatment and comparison groups of *adjusted costs*, e.g., adjusted Medicaid costs or adjusted public assistance payments. The *difference* between adjusted costs for the treatment and comparison groups provides an estimate of the cost savings.

Results

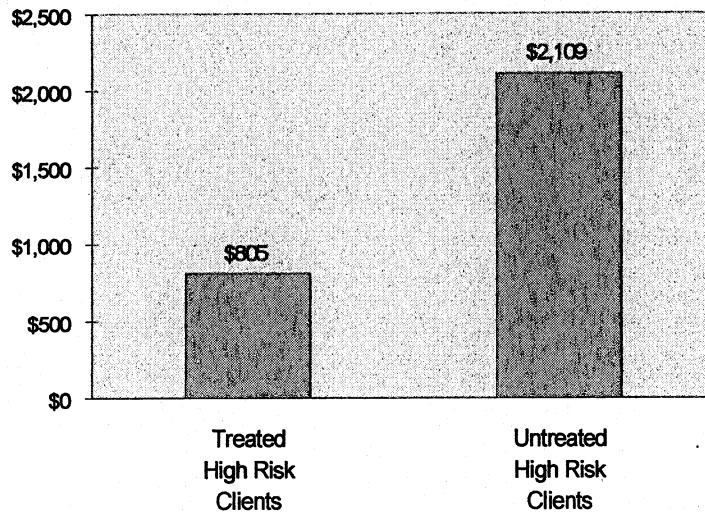
Public assistance and Medicaid costs represented 86% of the total costs, chemical dependency treatment reentry accounted for the remaining 14%. These percentages translate into the following average dollar cost figures for the 12-month follow up period: public assistance--\$1,127; Medicaid costs--\$1,111; and treatment reentry costs--\$356. The results of the Medicaid analysis are shown in Figure 1. The average client in the treatment group incurred an estimated \$713 in (adjusted) Medicaid costs compared to \$1,360 for the comparison group. Approximately two-thirds (\$422 of \$647) of the cost reduction represented a reduction in inpatient hospital costs. The reduction in Medicaid costs varied by treatment modality. Clients receiving intensive inpatient treatment had the lowest Medicaid costs (\$664), clients receiving outpatient treatment had the highest Medicaid costs (\$935).

Figure 1: Adjusted Medicaid Costs (n=724)



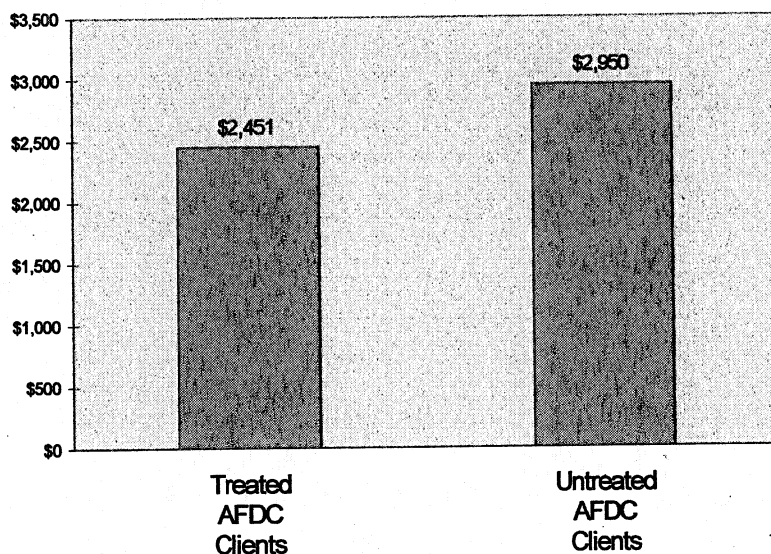
An effort was made to define “high risk” groups and to explore whether high-risk treated groups exhibited greater cost reductions than low-risk treated groups. For purposes of the Medicaid analysis, high risk was defined according to the variable “hard drug use,” which included clients using opiates, heroin, amphetamines, hallucinogens and cocaine. Approximately one-third of the study population was classified as a hard drug user. The results of this analysis are shown in Figure 2 below. Hard drug users who received treatment incurred \$805 in Medicaid costs in the year after treatment. In contrast, untreated hard drug users had \$2,109 in Medicaid costs during the same period—a difference of over 250%.

Figure 2: Adjusted Medicaid Costs for High-Risk Clients (n=724)



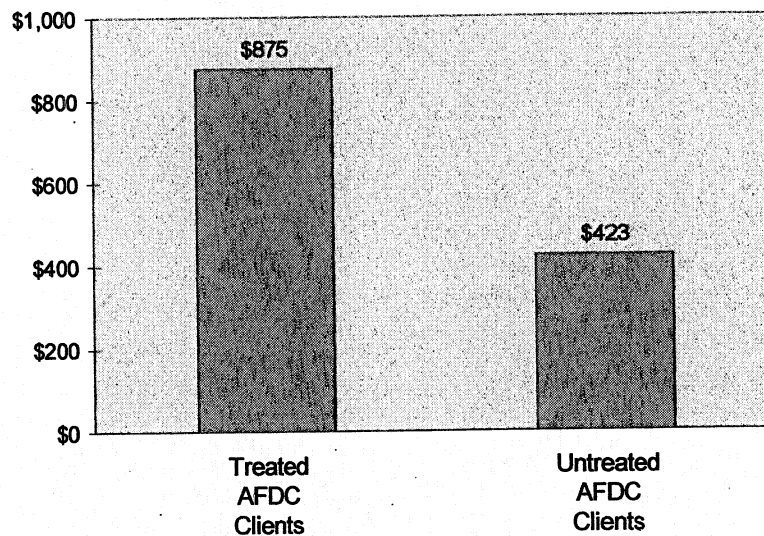
It was hoped that ADATSA clients would be able to reduce their reliance on public assistance after completing treatment. This hope was unfulfilled: the average treated client incurred \$89 more in adjusted public assistance payments than the average comparison group client during the follow up period. But for clients with *greater dependence upon welfare*, such as AFDC recipients, positive cost savings were achieved (Figure 3). During the 12 months following treatment, treated AFDC clients had \$2,451 in adjusted welfare costs as compared with \$2,950 for untreated AFDC clients. This represents a 17% decrease in welfare payments.

Figure 3: Adjusted Public Assistance Costs for AFDC Clients (n=721)



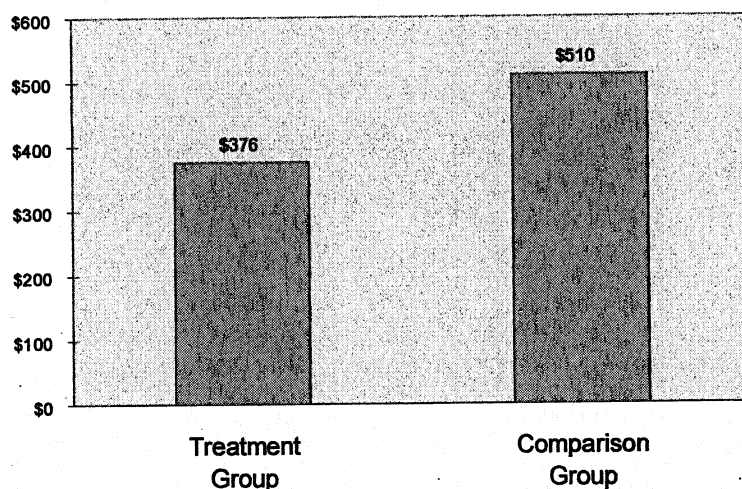
AFDC clients who were heavily dependent upon welfare prior to treatment may have been able to reduce their dependence through obtaining jobs and earning wage income. Figure 4 compares posttreatment quarterly earnings of treated and untreated AFDC recipients. The average AFDC recipient in the treatment group had quarterly earnings of \$875, more than double the earnings of untreated AFDC recipients (\$423). It should be remembered that improving employment outcomes for AFDC recipients was not a goal of treatment, rather the goal was to help clients become abstinent and improve the stability of their home life so they could take care of their dependent children.

**Figure 4: Average Quarterly Wages Post Treatment
for AFDC Clients (n=145)**



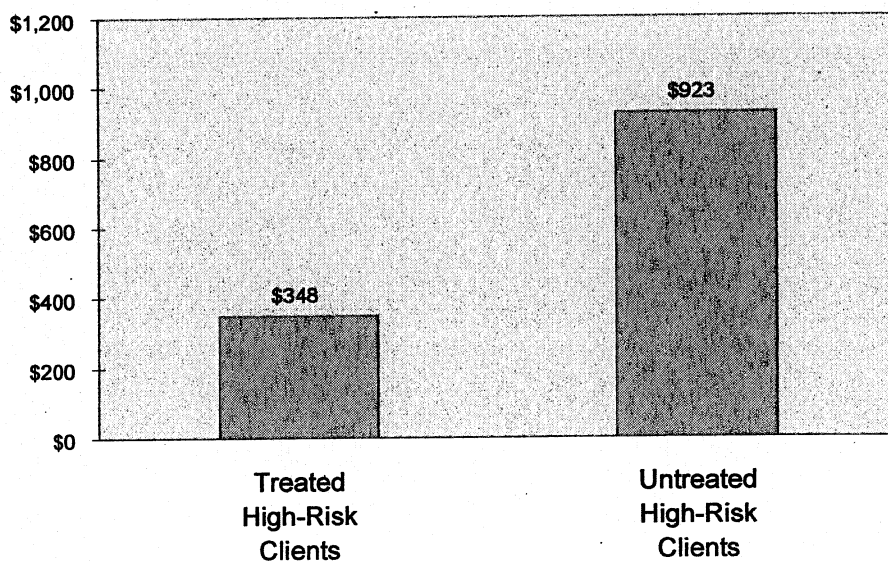
Clients in the treatment group exhibited a modest reduction in treatment reentry costs during the 12 months following treatment (Figure 5). Adjusted costs for the treatment group were \$134 lower, on average, than for the comparison group. This \$134 cost savings reflects a combination of cost reductions for different treatment services. Reentry costs for inpatient treatment were \$96 lower for the treatment than comparison group, detox costs were \$121 lower. In contrast, outpatient costs were higher by \$82. These higher outpatient costs may reflect treated clients' increased need for supportive aftercare, while the lower (-\$121) detox costs may reflect decreased relapse rates among the treatment group. Note for purposes of this analysis the treatment group was limited to clients who completed the full continuum of treatment; the comparison group was limited to clients who applied for but did not enter treatment initially. Limiting the analysis to these two groups of clients was done to provide a more meaningful assessment of treatment reentry that could better capture the effects of treatment. This change reduced the number of cases analyzed to 371.

Figure 5: Adjusted Treatment Reentry Costs (n=371)



Treatment reentry costs for high-risk clients were also examined. For this analysis, high risk was characterized in terms of the number of prior admissions to treatment. Clients with more prior admissions were assumed to be at higher risk for relapse, which, in turn, would lead to increased treatment reentry costs. Clients with three or more prior admissions (135 clients or 20%) were classified as high risk for increased treatment reentry costs. The results are shown in Figure 6. As indicated, untreated high-risk clients had much higher reentry costs than treated high-risk clients (\$923 vs. \$348).

Figure 6: Adjusted Treatment Reentry Costs for High-Risk Clients (n=371)



For the average treated client, the estimated savings for the three cost outcome areas analyzed, Medicaid, public assistance and treatment reentry, were, respectively: -\$647, (+\$89) and -\$134, implying total savings of **\$692**. The corresponding cost saving figures for high-risk clients were: -\$1,304, -\$499 and -\$575.

These cost savings figures compare favorably with treatment costs. For the average client, the (incremental) cost of treatment was \$1,779, compared to a benefit of \$692. In other words, for **every \$1 invested** in the average client's treatment, **38 cents was recouped** in the form of reduced Medicaid, public assistance and treatment reentry costs during the 12-month period following treatment. The average cost of treating clients defined as high risk for Medicaid, welfare or treatment reentry expenditures were, respectively, \$1,940, \$1,540 and \$1,867. Comparing the benefit values given above to these cost figures, yields benefit-cost estimates of 0.67, 0.32 and 0.31, respectively. Thus, for example, for **every \$1 invested** in the treatment of a Medicaid high-risk client, **67 cents would be recouped** during the first 12 months following treatment in reduced Medicaid costs alone.

CONCLUSION

Substance abuse continues to pose major challenges for society. Although the costs of treatment and prevention efforts compared to the total economic cost of substance abuse (measured in terms of crime, lost productivity, etc.) is minuscule—less than one percent—questions continue to be asked, appropriately, about the effectiveness of these efforts.

The results of this analysis suggest that ADATSA treatment does have important short-run economic benefits that compare favorably with the costs of treating clients. The combined economic impact of treatment in terms of cost savings for Medicaid, public assistance and treatment reentry translates into a benefit representing 38% of treatment costs. There is little doubt these benefits persist beyond the initial year after treatment, so the benefit-cost calculus of treatment would become even more favorable if long-term cost savings were measured. For high risk clients, ADATSA treatment may yield cost savings that represent an even larger economic benefit. There is little doubt that ADATSA treatment yields important cost savings beyond what were measured here, especially in the area of drug-related crime. Based on the limited cost-benefit analysis reported here, ADATSA treatment appears to yield dividends well worth the modest investment of state resources.

INTRODUCTION

Substance abuse continues to claim wide attention as a serious societal problem, imposing enormous economic costs in the form of lost productivity, premature death, crime, and medical care use. In Washington alone, these economic costs were estimated at \$1.9 billion for 1990 (closer to \$2.4 billion if measured in current dollars).¹ One of every five hospital discharges in Washington in 1990 had a primary or secondary diagnosis related to substance abuse--a fact that illustrates the pervasive effect of substance abuse on physical and mental health.¹ The economic cost of substance abuse on a national basis dwarfs the costs for Washington State. While the precise cost is unknown, findings of well-known studies suggest that the total economic loss to society of substance abuse on a national basis is in the range of \$150 to \$200 billion, measured in 1993 dollars.²

Significant public (and private) resources are allocated each year to fund substance abuse treatment and prevention activities. Washington, an acknowledged leader among states in the planning and evaluation of substance abuse programs, established an innovative program in 1987 to provide support for the treatment of indigent, chemically dependent persons. Funded through the Alcoholism and Drug Addiction Treatment and Support Act (ADATSA) and administered by the Division of Alcohol and Substance Abuse (DASA), this program is intended to offer addicted indigent persons, unemployable because of chemical dependency, an alternative to public assistance.

The primary goal of the program is abstinence. Ancillary goals include improving skills in the areas of personal coping and vocational and social functioning. If successful, ADATSA treatment should improve clients' health and functioning, in turn, reducing the need for public assistance, medical care, further treatment and other public services.

To the degree that ADATSA treatment reduces the ongoing need for these types of services, it should generate cost savings. ADATSA, like many other state-funded programs, has been challenged to demonstrate its effectiveness and cost savings potential. DASA, which administers the program, has responded to this challenge by supporting a number of studies and analyses. One important study was undertaken by the Office of Research and Data Analysis (ORDA).³ This study, one of the most ambitious of its kind undertaken to date, sought to measure and quantify a broad range of outcomes associated with ADATSA

treatment, including the cost savings (or cost avoidance) associated with treatment.

In particular, the ORDA study examined the degree of cost avoidance in the 12-month period following treatment in three areas: public assistance, Medicaid expenditures and treatment reentry. The analysis found that ADATSA treatment, on average, reduced costs in these three areas by \$222, which represented 11% of treatment costs for the average client. But the degree of cost avoidance varied by client group, e.g., for young (under 30) males receiving treatment, the cost avoidance rate was 50% (\$808 avoided in absolute dollars).

Because of its broad scope and complexity, the earlier ORDA study was limited in its ability to examine any single outcome area in great detail. DASA has commissioned further studies building on the initial ORDA study. ORDA is currently gathering and analyzing 5-year follow-up data on clients to evaluate long-term outcomes of treatment.

The aim of the present study is to perform a secondary analysis of the ADATSA/ORDA database to further examine the cost savings associated with ADATSA treatment during the initial 12-month period following treatment. The analysis focuses on three areas: public assistance payments, Medicaid expenditures, and treatment reentry costs. Using multivariate statistical techniques, the study first estimates the reduction in costs for each of these areas, then examines these cost savings in relation to treatment costs. In effect, the study represents a conventional economic cost-benefit analysis, with the benefits of treatment measured in terms of reduction in program costs.

This analysis is limited in scope. It does not take account of important economic benefits of treatment, such as reduced crime, that would appropriately be incorporated into a cost-benefit study undertaken from a broader societal perspective. But there is justification for pursuing a more limited agenda. State government officials are accountable to taxpayers for state program budgets, and substance abuse by nature unavoidably affects these budgets. Although important, societal costs go well beyond the scope of concern of state governmental officials.

Literature Review

Numerous evaluations of substance abuse treatment have been performed,⁴⁻⁷ but most have focused on restricted outcome measures related to drug or

alcohol use, and hence offer little insight into the economic impact of treatment. Few studies consider economic variables, and fewer still assess treatment populations similar to the ADATSA client population. Thus, there are but a few studies that might be considered directly relevant in terms of outcome measures and treatment setting and population. Despite these shortcomings, the literature does provide some evidence regarding economic outcomes of treatment that helps establish a context for interpreting the findings presented here.

Early economic studies of alcoholism treatment tended to rely on unsophisticated methodologies. These studies produced findings suggesting a positive benefit-cost ratio in the range of 1.4-3.0:1.0.^{8,9} In other words, for every \$1.0 invested, the economic benefits associated with treatment in the form of reduced crime, decreased medical care utilization, and lower subsequent treatment costs ranged from \$1.4 to \$3.0. Studies of alcoholism treatment have found the greatest economic benefits accruing in the form of reduced use of medical care, while studies of drug treatment have found reductions in criminal activity to be the primary economic benefit. Two early reviews of medical cost-offset studies published in 1979 by Jones and Vischi¹⁰ and in 1987 by Holder¹¹ drew attention to the impressive reductions in medical costs that often followed alcohol treatment. Untreated alcoholics generally incur health care costs that are at least double those of nonalcoholics.¹¹

Later studies used more sophisticated methods to estimate medical cost offsets. One notable study, performed in four HMO settings, involved almost 2,000 subjects, 700 of whom were controls matched on the basis of age, sex, and length of enrollment within each health plan.¹² During the 18-month follow up, the number of days of reported illness for the average treated alcoholic declined by 50%. Outpatient visits declined markedly as well, although the treatment group still had double the number of visits of the control group.

Forty-five percent of the treatment group were categorized as having "poor medical outcomes," measured in terms of cost offsets. These patients tended to be *older* and have more *serious drinking problems*, suggesting that the degree of chronicity and severity of addiction are important factors affecting treatment success.

One of the very few medical offset studies involving a treatment population similar, at least in some regard, to the ADATSA population was an analysis of Medicaid patients in Illinois.¹³ Prior to treatment these clients incurred high inpatient hospital costs that accelerated rapidly in the months preceding

treatment—a pattern noted by many other studies. Within the initial year in which expanded addiction treatment became available through the Medicaid program, health care costs declined by 50%. For a small percentage of high-resource utilizers, the decline in health care costs was even greater.

One of the more ambitious and methodologically sophisticated studies was based on insurance claims data provided by Aetna Insurance Company (known as the Aetna Study).¹⁴ This study showed that for the average treated client, treatment paid for itself within two to three years, but the magnitude of the cost offset depended somewhat upon the specific statistical adjustment used. This study is important both for its substantive findings and for its methodological lessons. It clearly demonstrates the value of using appropriate statistical methods to analyze treatment outcomes.

The final study noted within this group of studies was conducted by Holder and Blose,¹⁵ based upon insurance claims data spanning up to 14 years gathered from a large Midwestern manufacturing company. This investigation found medical cost offsets similar to those reported by the Aetna study. Treatment paid for itself usually within two years, but older patients with more chronic alcohol problems fared worse and continued to experience higher medical care utilization after treatment. By six years after treatment, medical costs for the average treated alcoholic almost converged with costs for the comparable nonalcoholic.

Another body of literature, perhaps more relevant to the ADATSA population, characterizes the treatment experience and outcomes of more “hard core” drug dependent clients receiving publicly-supported drug treatment. The first major federal effort to assess drug treatment outcomes was the Drug Abuse Reporting Program (DARP), which resulted in the publication of several volumes of results and numerous papers.¹⁶⁻¹⁹ As reported by Sells and Simpson,²⁰ drug treatment had a favorable outcome, measured in terms of post-treatment drug use and criminal activity, in roughly 25% of clients, and a moderately favorable outcome in another 30% to 40% of clients. Among the DARP client population, time in treatment proved to be an important predictor of outcomes: clients who stayed in treatment longer almost always exhibited better outcomes.

Following DARP, the federal government initiated the Treatment Outcome Prospective Study (TOPS), a multiyear follow-up study involving 12,000 clients from selected cities.²¹ During the year prior to treatment, approximately 15% of the clients receiving treatment in therapeutic community settings were employed

at least part time for forty weeks, while 25% of the clients participating in outpatient drug-free programs were similarly employed. While not strictly comparable, these employment rates are roughly similar to those of ADATSA clients. Employment increased after treatment for both outpatient clients and clients in therapeutic communities. At one year, 38% of clients in the former group and 27% of those in the latter group reported being employed full time, but further analyses showed that earned income of these clients increased by only 10%. Income-generating crime decreased by roughly 65% for both groups.

The benefit-cost ratio of treatment in therapeutic community settings, including reductions in crime-related costs during and after treatment, was estimated to be approximately 2 to 1.²² In other words, for every \$1 invested, treatment yielded \$2 in economic benefit to society. The benefit-cost ratio for outpatient treatment was even higher.

The findings of TOPS again highlights the importance of treatment retention. For unstable addicts with criminal backgrounds, brief treatment was not cost-effective because it simply was not effective.

More recent economic evaluations of substance abuse treatment come from unpublished studies of client populations in California,²³ Oregon²⁴ and Minnesota.²⁵ While instructive, none of these studies is directly comparable to present study, or to the previous ORDA study, due to differences in research design, data collection and statistical methods.

The largest, and most ambitious, investigation is the California study, commonly known as CALDATA (California Drug and Alcohol Treatment Assessment). Using sophisticated sampling procedures, this study followed up and interviewed approximately 1,800 clients discharged from treatment during the 12-month period ending September 30, 1992. This study was able to achieve a modest response rate of 46%, despite the use of sophisticated and aggressive tracking procedures. The research design employed by CALDATA was a before-after design, that is, clients were queried about their behavior prior to and after treatment, and the responses were then converted into change scores. The study did not incorporate information from an untreated comparison group, nor did it employ multivariate statistical methods. More important, the change scores analyzed were based upon retrospective recall of behavior and events that occurred up to 24 months earlier. These study characteristics represent important methodological limitations of this outcome evaluation.

As part of the study, the investigators estimated the "cost savings to taxpayers" resulting from treatment. Costs savings were measured in terms of reduction in crime costs (victim and theft costs), in public assistance payments, and in health care costs. The study found positive and substantial cost savings accruing from treatment. For inpatient residential treatment, the "benefit-cost" ratio was on the order of 4:1—in other words, for \$1 invested in treatment, \$4 were saved in terms of taxpayer costs. The benefit-cost ratio for outpatient treatment was even higher. But *70% of the total savings were crime-related* and included savings accruing both during and after treatment. Furthermore, the savings were based upon cost data (e.g., average property loss per crime or average lost productivity of victim) obtained from a wide variety of external sources, most of which represented national data. Basing cost savings on extrapolated data can be hazardous and lead to biased results. The study documented a modest reduction in health care expenses of 23%—less than estimated for the present study of ADATSA clients.

The Minnesota study involved 6-month follow-up of clients admitted to treatment during 1991 and 1992. Random follow-up is performed as a condition of treatment certification in Minnesota. Of 48,865 clients admitted, 11,179 (23%) were successfully followed up and interviewed. Follow-up data were collected on various measures pertaining to drug use, employment, criminal activity, hospital admissions, and treatment reentry. Treatment effectiveness was measured in terms of before-after comparisons, limited to 6 months pre- and posttreatment.

A "cost offset" analysis was performed to assess the savings attributable to treatment. Like the California study, costs were based upon extrapolated data and on estimates obtained from external sources. No untreated comparison group was incorporated into the analysis. It was estimated that on an annual basis, 67% of treatment costs were "recovered," in other words, for every \$1 invested in treatment, \$0.67 was saved in the form of reduced costs for hospitalization, further treatment, and arrests. Almost *half* of the cost reduction came from cost savings related to reduced arrest rates. While interesting and informative, the data provided by this study are subject to important limitations.

The third economic study, performed in Oregon, assessed outcomes among a sample of clients who completed treatment during 1991 and 1992. Treatment completers were matched with a sample of untreated clients, and then outcome data were gathered from various state databases on all clients ($n = 1,125$) over a period of 36 months (24 months of baseline pre-treatment data were also

collected). These data included information on criminal activity (arrests, convictions, and incarceration), employment, public assistance (food stamps), and medical care use. A cost avoidance analysis was performed as part of the study to estimate the dollar savings associated with treatment. For some costs, data from state records were obtained, e.g., public assistance and medical costs. For other costs, e.g., victim and theft crime costs, cost estimates were based upon extrapolated data. It was estimated that for every \$1.00 invested in treatment, \$5.60 was recouped in the form of avoided costs. Once again, most of the estimated avoided costs (67%) were crime related—victim and theft costs. While impressive, one has to judge crime-savings data with some caution, given the methods used to generate these data.

The cost savings estimates discussed above for the California, Minnesota and Oregon studies are not strictly comparable to the estimates of cost savings for the ADATSA program. Each study uses somewhat different methods, definitions and statistical procedures. But more importantly, these studies include estimates of crime costs, which are not included in the ADATSA cost savings estimates. Crime costs represent roughly 70% of the estimated cost savings. It should therefore be expected that ADATSA cost savings estimates would be considerably more modest.

The analysis described in the sections that follow suggests the ADATSA program yielded cost savings for medical care, public assistance and treatment reentry on the order of 38% for the initial year following treatment. In other words, for every \$1.00 invested in treatment for the average client, \$0.38 were saved in program costs for the above three areas during the first 12 months after treatment. But, as discussed below, for certain clients who may be considered "high risk," the savings were greater, on the order of 120%.

METHODS

Study Population

This study (like the previous ORDA study) utilized a quasi-experimental design. Its sample frame consisted of clients applying for treatment between August and November 1989. Clients who completed the full continuum of treatment or completed at least the primary phase of treatment were combined and included in the treatment group. The great majority of clients starting treatment completed it by June 1990. The comparison group consisted of clients who were

screened and judged eligible for ADATSA treatment, but who either did not begin treatment or began but dropped out of treatment prior to completing the initial phase.

The treatment group consisted of 366 clients, the comparison group 354 clients. Excluded from the analysis were (1) a small number of clients who died during the study period and (2) clients on Supplemental Security Income (SSI). The analysis included two groups not included in the main cost avoidance analyses conducted earlier by ORDA: clients receiving Aid to Families with Dependent Children (AFDC) and felony offenders. These two groups represented approximately 250 clients (roughly a third of the total ADATSA sample) and thus contributed important information to the analysis. By including them, but controlling for their group status through statistical techniques, it was possible to improve the efficiency of the estimates, and hence improve the robustness of the findings.

ADATSA clients were referred to different treatment modalities. Table 1 shows the distribution of clients among the three modalities analyzed for this study: intensive inpatient treatment, outpatient treatment and other residential treatment, which included extended recovery house, recovery house, and long-term residential treatment. As shown, most clients were referred to intensive inpatient treatment, which accounted for 234 of the 366 treatment-group clients. The treatment groups for the other two modalities were considerably smaller, with outpatient treatment consisting of 64 clients and other residential treatment 68 clients. The small number of treatment-group clients in these two modalities precluded performing most analyses for separate modalities. The number of comparison-group clients varied from 265 in intensive inpatient treatment to 221 in other residential treatment. The difference in comparison-group clients reflected different numbers of referrals, along with different dropout rates.

Data and Measures

As noted earlier, this study examined cost savings in three areas: Medicaid expenditures, public assistance payments and treatment reentry costs. Cost data on ADATSA clients were collected from various state data systems maintained by agencies with programmatic responsibility in these areas, then compiled by ORDA in statistical files. Medicaid costs included all inpatient and outpatient *medical expenditures*, exclusive of Medicaid payments made for substance abuse treatment. The cost data were grouped into three general categories: inpatient, outpatient and total costs (the sum of inpatient and

outpatient costs), summed over the 12-month follow-up period. Public assistance costs were measured through a single variable representing the sum of all welfare payments made to clients during the 12-month follow-up period,

Table 1. Descriptive Information on Treatment and Comparison Groups

Group	Number	Percentage
<i>All Modalities Combined</i>		
Treatment group	366	50.5
Comparison group	358	49.5
<i>Selected Modalities</i>		
<i>Intensive Inpatient</i>		
treatment group	234	46.9
comparison group	265	53.1
<i>Outpatient</i>		
treatment group	64	21.1
comparison group	241	78.9
<i>Other Residential</i>		
treatment group	68	23.6
comparison group	221	76.4

including AFDC payments as well as payments for general assistance unemployable (GAU). The third cost outcome area representing treatment reentry costs were measured through several variables representing the following services: detox, inpatient treatment, and outpatient treatment. The database included cost information for each of these services, along with an aggregate measure representing reentry costs summed across these three service areas.

In addition to the above described measures, the study's database contained a large number of client variables that served as covariates (control variables) in the analysis. These variables, gathered from a special client survey form and directly from treatment agencies, included the following: age, age at first drug use, severity of dependence, gender, living arrangement, education, ethnic group, existence of mental health problems, number of disabilities, prior treatment admissions, and type of drug use.

Analytic Procedures

The study relied on multiple regression analysis to estimate the cost savings associated with treatment. This statistical technique allows the relationship between two variables to be determined, holding constant the effects of other variables. In the context of the present study, this allowed the analysis to estimate the independent effects of treatment on cost outcome measures, controlling for variables such as age, age at first use, severity of dependence, gender, education, ethnic group, and prior admissions.

In this way, it was possible to derive estimates for both the treatment and comparison groups of **adjusted costs**, e.g., adjusted Medicaid costs or adjusted public assistance payments. The *difference* between adjusted costs for the treatment and comparison groups provides an estimate of the cost savings associated with treatment. The study's findings, presented in the figures shown in the sections that follow, represent adjusted costs.

The multivariate statistical analysis enabled the study to generate adjusted cost estimates, but did not *guarantee* that the findings would be free of any bias. It is still possible that *unmeasured factors* related to clients' treatment status and to their cost outcomes could confound the analysis, since clients were not assigned at random to treatment. Therefore, the results presented should be interpreted with appropriate caution.

RESULTS

We begin by showing descriptive information on the study population (Table 2) and on the cost outcome measures (Figure 1). The data shown in Table 2, and the cost information presented subsequently, are based on data weighted to reflect the overall ADATSA client population. As shown in Table 2, almost two-thirds of the study population was male, with an average age of 32. Forty-two percent of the clients had less than a high school degree but 10% had at least some college or post-high school training. Sixty-nine percent of the clients were white, 18% were black, 9% were Native American and the remainder were other nonwhite. Reported age at first drug use was 17, and 32% of the clients were classified as "hard drug users" based upon frequency and type of use. Forty percent of the clients reported having alcohol as their primary drug, while 27% reported having drugs other than alcohol as their primary drug.

Table 2. Descriptive Information on Client Population (n = 731)

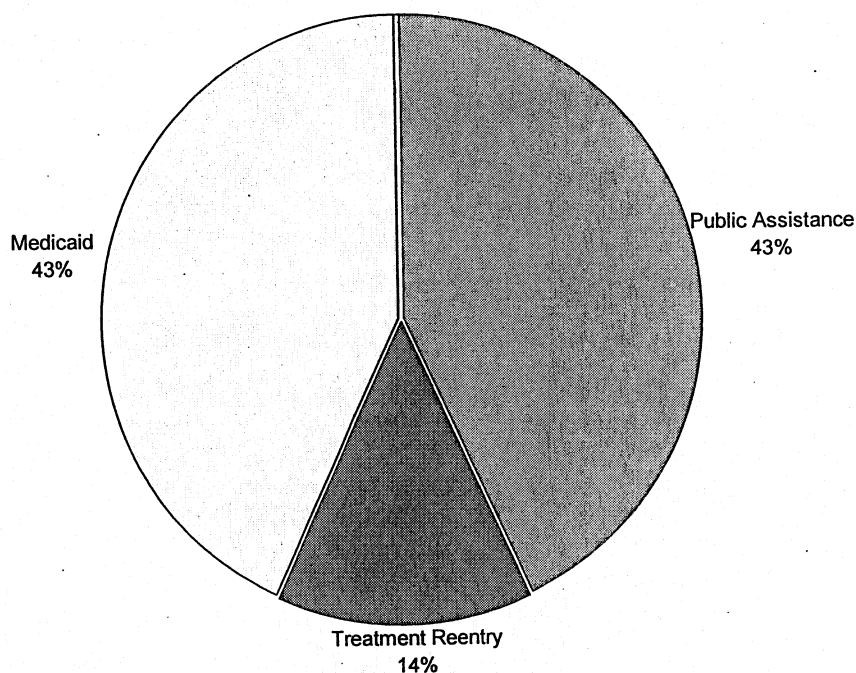
Characteristic	Mean or Percent (S.D.)
Male (%)	63.5
Age	32.3 (8.6)
Less than high school (%)	42.2
High school graduate (%)	46.5
Some college or post high school training	9.9
<i>Race</i>	
White	68.8
Black	17.8
Native American	9.1
Other Nonwhite	4.3
Age at First Drug Use	17.4 (7.4)
Hard Drug User (%)	31.9
<i>Primary Substance of Abuse</i>	
alcohol	39.4
drugs	26.7
alcohol and drugs	33.9
Mental Health Problems (%)	20.8

Figure 1 shows the distribution of costs for the three cost outcome areas analyzed. As shown, public assistance and Medicaid costs represented 86% of the total costs, with treatment reentry costs accounting for the remaining 14%. Translated into average (per client) dollar cost figures, the cost outcomes are as follows: public assistance--\$1,127; Medicaid costs--\$1,111; and treatment reentry costs--\$356. In other words, the average client in the study population (which combines the treatment and comparison groups) incurred \$1,111 in Medicaid costs, \$1,127 in public assistance costs, and \$356 in treatment reentry costs during the 12-month period following treatment.

The fundamental analytic question addressed by the study was: *To what extent did treatment reduce these costs and thus contribute to cost savings for program budgets within these areas?* It is clear that any cost savings realized are likely

to come from either Medicaid or public assistance, since costs in these two areas represented 86% of total costs.

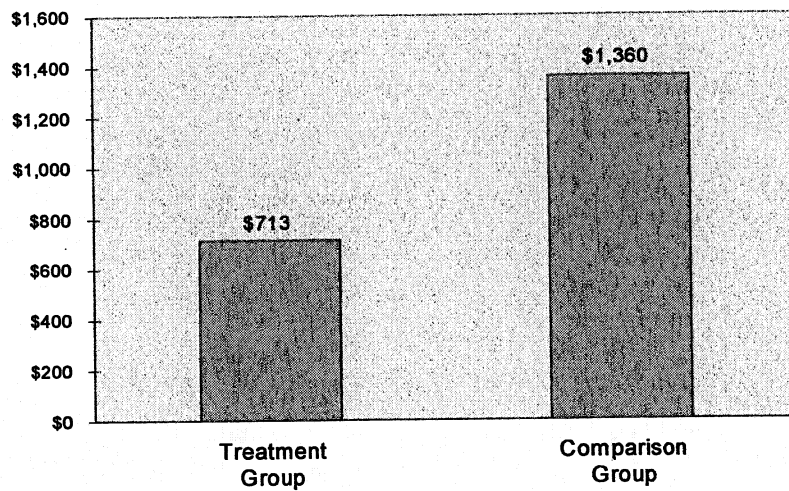
Figure 1: Distribution of Outcome Costs



The sections that follow highlight findings regarding the cost savings of ADATSA treatment within each of the three cost outcome areas examined. After outlining these findings, the report presents information comparing these cost savings to the actual cost of treatment.

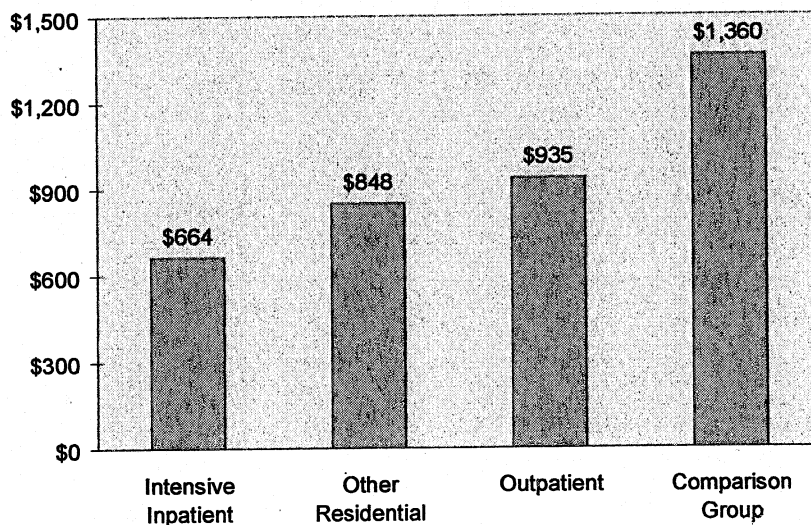
Figure 2 summarizes the main results of the regression analysis, showing adjusted Medicaid (total) costs for the treatment and comparison groups during the 12-month follow-up period. The average client in the treatment group incurred an estimated \$713 in (adjusted) Medicaid costs compared to \$1,360 for the comparison group. This \$647 difference in costs was statistically significant ($p < .01$). Approximately two-thirds (\$422 of \$647) of the cost reduction represented a reduction in inpatient hospital costs, the remaining reduction (\$225 of \$647) reflected decreased outpatient costs. Given the higher pre-treatment inpatient costs, it is not surprising that most of the savings in post-treatment costs would come from reduced use of inpatient medical services.

Figure 2: Adjusted Medicaid Costs (n=724)



Because a substantial portion of the study population incurred at least some Medicaid costs, it was possible to estimate the reduction in costs by treatment modality. Shown in Figure 3 are the results of this analysis. (Note the number of cases analyzed were as follows: intensive inpatient, 499; other residential, 289, and outpatient, 305.) The lowest estimated costs were for intensive inpatient treatment, followed by other residential treatment. Clients treated in outpatient settings had higher estimated costs (\$935). There was no statistically significant difference in costs between "other residential" or outpatient treatment and the comparison group; the difference in costs between intensive inpatient and the comparison group was significant ($p = .02$).

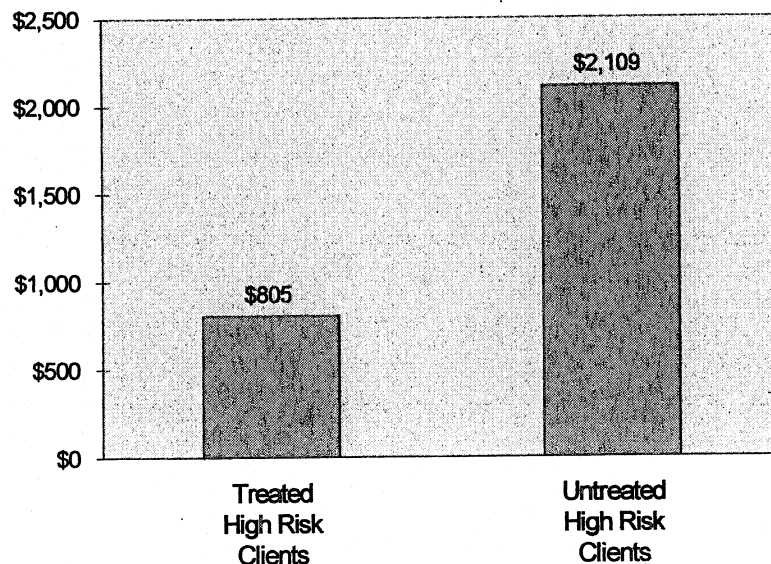
Figure 3: Adjusted Medicaid Costs by Modality



As one aspect of the analysis, an effort was made to define “high risk” groups and to explore whether high-risk treated groups exhibited greater cost reductions than low-risk treated groups. For purposes of this analysis, high risk was defined according to the variable “hard drug user,” which categorized clients based upon type of drug use (heroin, opiates, cocaine, amphetamines, or hallucinogens). Approximately one-third of the study population was classified as a hard drug user. It was assumed that treatment would be particularly important for hard drug users in terms of decreasing Medicaid costs; therefore, untreated hard drug users were expected to have substantially higher Medicaid costs.

The effects of treatment for hard drug users were empirically estimated by testing a regression model that included an interaction term defined by the variables “treatment” and “hard drug user.” The results are shown in Figure 4. The expectation of a treatment-high risk interaction effect was supported. Hard drug users who received treatment incurred an estimated \$805 in Medicaid costs in the year after treatment. In contrast, untreated hard drug users had \$2,109 in Medicaid costs during the same period—a difference of over 250%. Use of certain hard drugs among ADATSA clients appears to be a significant health risk factor leading to substantially increased demand for medical care. Treatment for such clients can improve health and thereby decrease medical costs significantly.

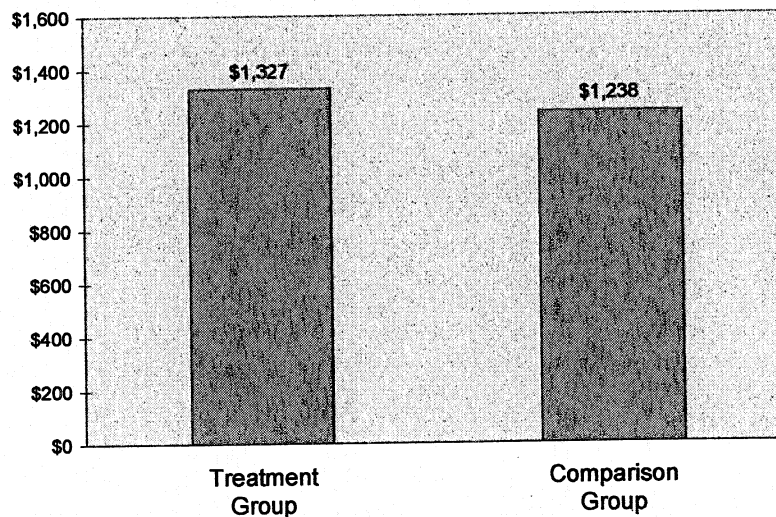
Figure 4: Comparison of Medicaid Costs for High-Risk Clients (n=724)



Savings in Public Assistance Costs

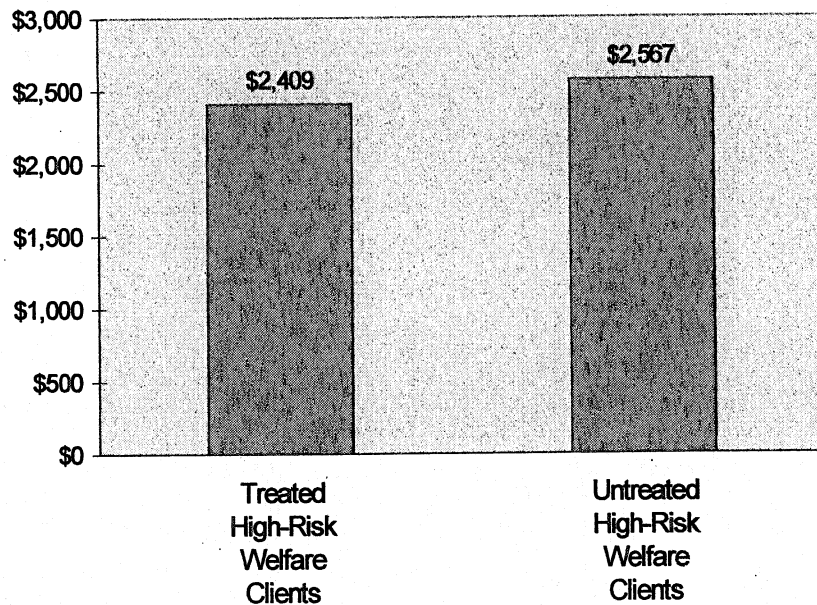
It was hoped that ADATSA clients would be able to reduce their reliance on public assistance after completing treatment. For the average ADATSA client, this hope was only partially fulfilled (see Figure 5), but for some groups of clients with greater dependence upon welfare, treatment had a more important effect. As shown in Figure 5, the treatment group had, on average, slightly higher adjusted public assistance costs during the follow up period than the comparison group (\$1,327 vs. \$1,238). This \$89 difference was not statistically significant.

Figure 5: Adjusted Public Assistance Costs (n=721)



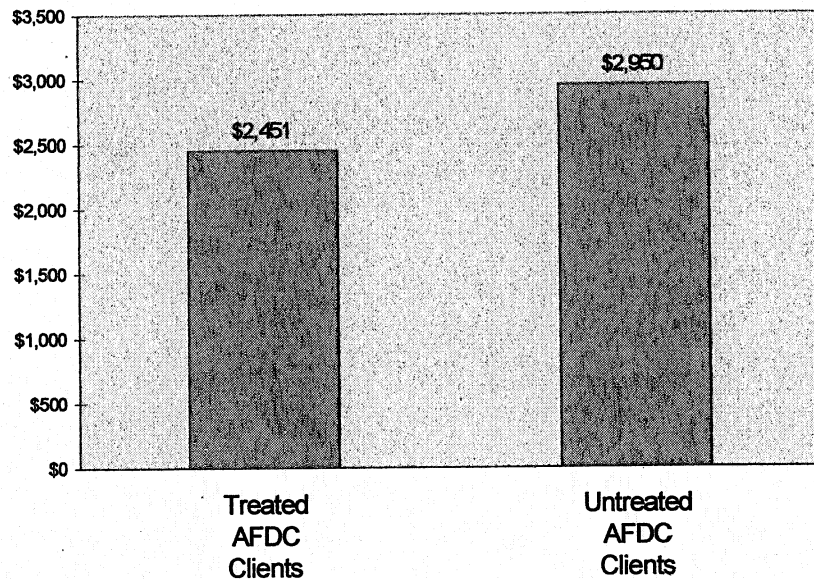
The question of whether treatment might reduce public assistance costs for groups with higher welfare dependence was also explored using two somewhat different approaches to classify clients. First, clients were categorized as "high risk" for continued welfare if, during the pre-treatment 12-month period, they had over \$1,000 in welfare payments. Of the 366 clients in the treatment group, 99 (27%) were classified as "high risk" for continued welfare dependence. A somewhat higher percentage (34%) was classified as such in the comparison group ($p = .03$). An interactive model was then specified and tested to determine the effects of treatment on public assistance costs for this selected group of clients. The results are shown in Figure 6. Treated high-risk clients exhibited a modest (\$159) decrease in adjusted public assistance costs compared with their untreated counterparts.

Figure 6: Adjusted Public Assistance Costs for High-Risk Welfare Clients (n=721)



As a second analysis, the effect of treatment on continued dependence on welfare was examined among AFDC clients. The study population included 145 AFDC recipients, equally divided between the treatment group (69 clients) and the comparison group (76 clients). An interaction model was specified with the treatment and AFDC variables representing the interaction term. The information generated by the model was then used to derive estimates of adjusted public assistance costs for treated and untreated AFDC clients. The results are shown in Figure 7. AFDC clients receiving substance abuse treatment had less continued dependence on welfare as indicated by their decreased welfare costs. During the 12 months following treatment, treated AFDC clients had \$2,451 in adjusted welfare costs as compared with \$2,950 for untreated AFDC clients. This represents a 17% decrease in welfare payments.

Figure 7: Public Assistance Costs for AFDC Clients (n=721)



The question arises whether clients who were heavily dependent upon welfare prior to treatment but less dependent after treatment (Figures 6 and 7) were less dependent because they held jobs and earned increased income. To explore this question, the study compared quarterly earnings *after treatment* of treated high-risk welfare clients (depicted in Figure 6) and of treated AFDC clients (shown in Figure 7) with their untreated counterparts. The results are shown in Figures 8 and 9 below. Compared with untreated clients, treated high-risk clients and treated AFDC recipients had significantly higher ($p < .01$) quarterly earnings in the 12-month period following treatment. For example, the average AFDC recipient in the treatment group had quarterly earnings of \$875, more than double the earnings of untreated AFDC recipients (\$423). These earnings figures are admittedly modest. They would be approximately 15% higher if updated to reflect current wage levels. More importantly, it should be remembered that improving employment outcomes for AFDC recipients was not a goal of treatment, rather the focus of treatment was to help clients become abstinent and improve the stability of their home life so they could take care of their dependent children. Against this background, the reduction in welfare dependence among AFDC recipients receiving substance abuse treatment is impressive.

Figure 8: Average Quarterly Earnings Post Treatment for Treated and Untreated High Risk Clients (n=222)

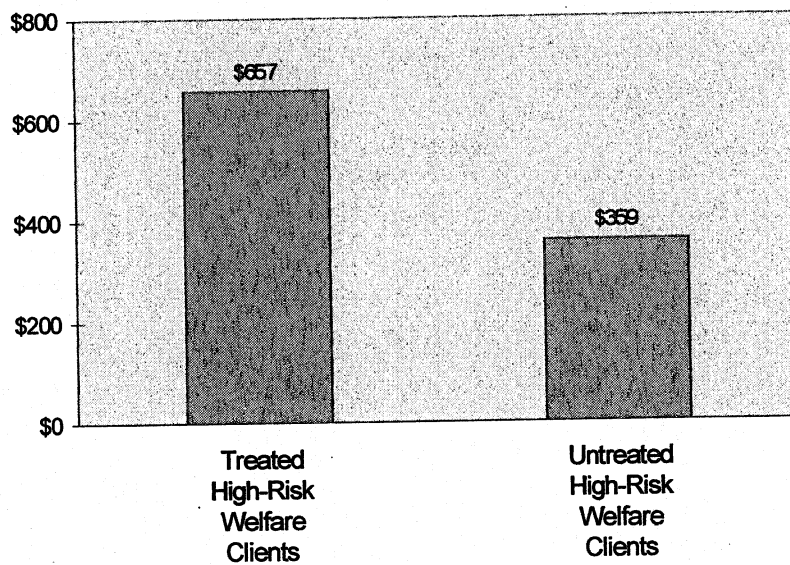
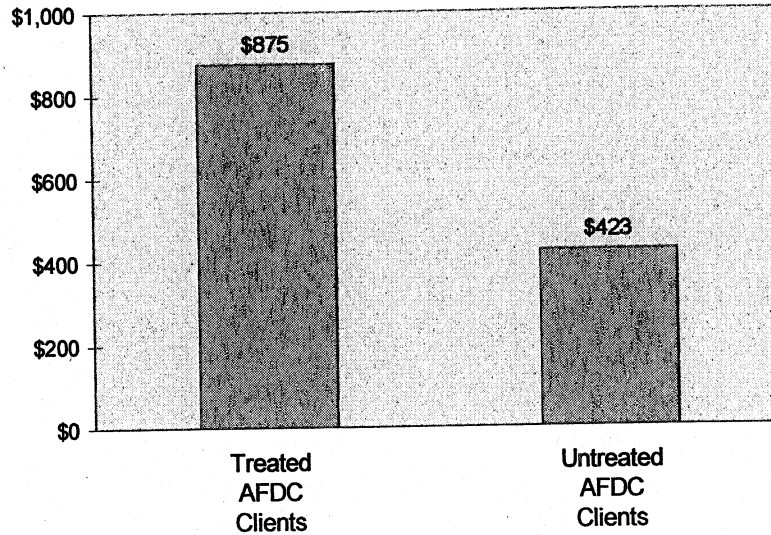


Figure 9: Average Quarterly Wages Post Treatment for AFDC Clients (n=145)

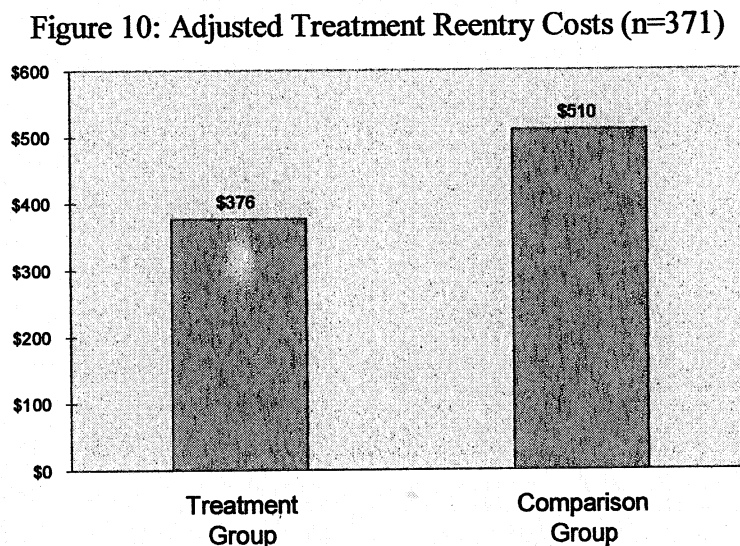


Savings in Treatment Reentry Costs

Finally, we turn to examining the third cost outcome area, savings in treatment reentry costs. While these costs were modest compared to the other two areas, accounting for only 14% of total outcome costs (see Figure 1), treatment reentry

costs are nonetheless important. There was a measurable reduction in treatment reentry costs among treated clients (Figure 10). Whereas clients completing ADATSA treatment had an estimated \$376 in reentry costs over the 12-month follow-up period, comparison group clients had costs of \$510. Clients who had reentry costs received different types of treatment, including inpatient, outpatient and detox. The \$134 average reduction in reentry costs (\$510 - \$376) shown in Figure 10 reflects the combination of reduced costs for different modalities.

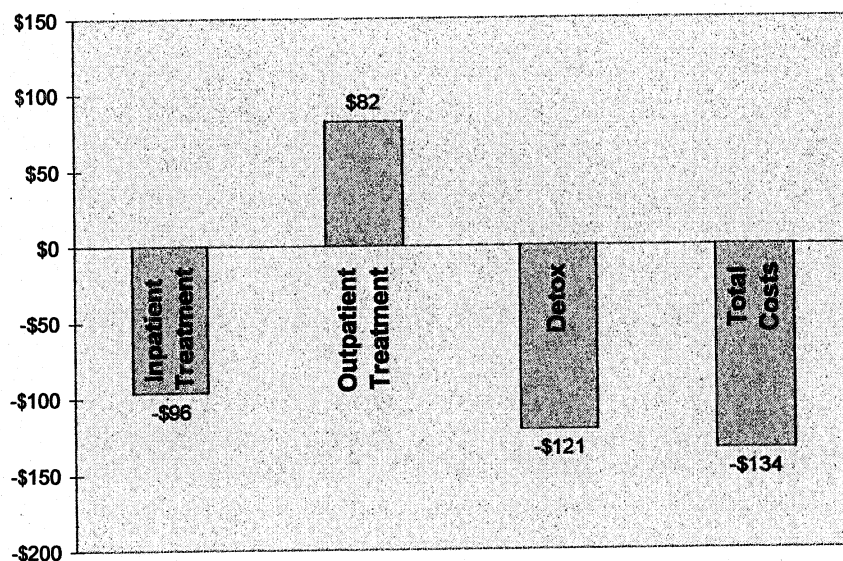
Note for this analysis the specification of the treatment variable was changed. For the previous analyses, the treatment group included clients who completed the full continuum of treatment as well as clients who completed only the initial phase of treatment. The comparison group included clients who received no treatment as well as clients who started treatment but dropped out early. For the assessment of treatment reentry, it was felt that a more meaningful analysis could be achieved by restricting the comparison to clients who completed the full continuum of treatment and clients who did not enter treatment initially. This change reduced the number of cases analyzed to 371.



The difference in treatment reentry costs (\$134) shown in Figure 10 reflects the costs of different treatment modalities clients reentered subsequent to their initial treatment. To examine these different costs, three separate regressions were performed for the three types of treatment clients received subsequent to their initial treatment: intensive inpatient, outpatient and detox. In other words, the initial regression analysis of total reentry costs was repeated for costs pertaining to the three specific types of treatment. The results are shown in Figure 11. As shown, reentry costs for inpatient treatment were \$96 lower for the treatment than comparison group. Detox costs among treatment clients were also lower by

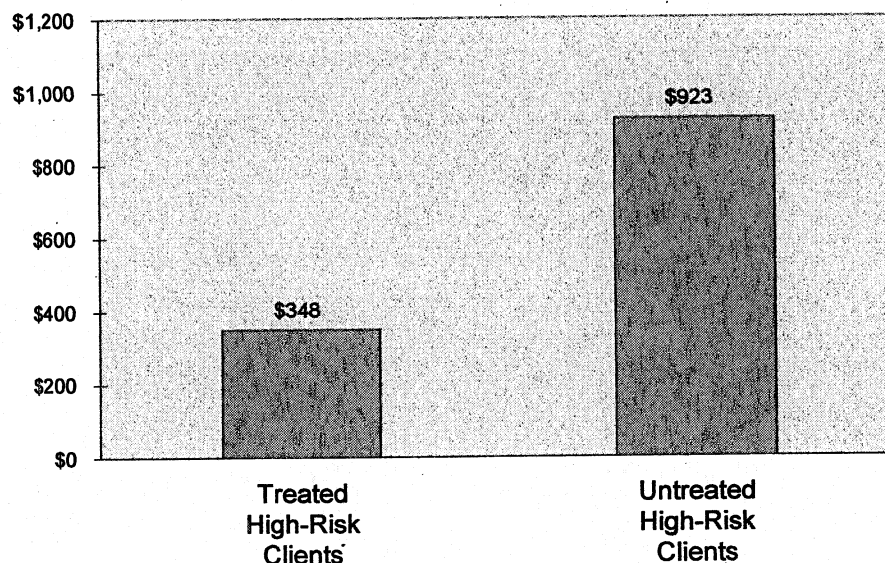
\$121. But outpatient costs were actually higher (by \$82) for the treatment group. The higher outpatient costs may reflect treated clients' increased need for supportive aftercare. It is noteworthy that the treatment group had substantially lower (by \$121) detox costs, which could reflect decreased relapse rates among the treatment group compared to the untreated comparison group.

Figure 11: Reentry Costs by Service Used (n=371)



As part of the analysis, the study examined the effects of treatment for high-risk clients. For this analysis, high risk was characterized in terms of the number of prior admissions to treatment. It was assumed that clients with more admissions were at higher risk for relapse, which, in turn, would lead to increased treatment reentry costs. Clients with three or more prior admissions (135 clients or 20%) were classified as high risk for increased treatment reentry costs. An interactive model was specified and tested, with the interaction term defined by the high-risk variable described above and the treatment variable. The results are shown in Figure 12. As indicated, untreated high-risk clients had much higher reentry costs than treated high-risk clients (\$923 vs. \$348).

Figure 12: Adjusted Treatment Reentry Costs for High-Risk Clients (n=371)



Cost Savings Compared to Treatment Costs

The previous sections described the cost savings associated with ADATSA treatment. For the average treated client, the estimated savings for the three cost outcome areas analyzed, Medicaid, public assistance and treatment reentry, were, respectively: -\$647, +\$89 and -\$134 (Figures 2, 5 and 11), implying total savings of \$692. Although more speculative, the corresponding cost savings values for high-risk clients (Figures 4, 8 and 13) were: -\$1,304, -\$499 and -\$575. (Note public assistance high-risk clients are represented here by the AFDC recipient group, Figure 8.)

In comparing the benefits (cost savings) and costs of ADATSA treatment, it is important that benefits and costs be measured similarly; that is, *incremental* benefits should be weighed against *incremental* costs. Incremental benefits have been measured and represent cost savings shown in the figures in the preceding sections. Stated simply, incremental benefit of treatment is the difference in adjusted costs for the treatment and comparison groups. The incremental cost of treatment is the difference between treatment costs for the two groups. Note the comparison group includes drop out clients who received some minimal treatment at some cost. For the average treatment and comparison group client, the cost of treatment was, respectively, \$2,120 and \$341. The difference in these two cost figures (\$1,779) can be considered the

incremental cost of treatment. It is this figure against which the benefit of treatment is to be compared.

The corresponding (incremental) treatment costs for the three groups of high-risk clients were as follows: Medicaid, \$1,940; public assistance, \$1,540; and treatment reentry, \$1,867.

The final step is to compare benefits to costs. For the average client, the incremental cost of treatment was \$1,779, the incremental benefit was \$692. In other words, for **every \$1 invested** in treatment for the average client, **38 cents was recouped** in the form of reduced Medicaid, public assistance and treatment reentry costs during the 12-month period following treatment.

For high-risk clients, the estimated benefit/cost values were as follows: Medicaid, \$1,304/\$1,940; public assistance, \$499/\$1,540; and treatment reentry, \$575/\$1,803. These values translate into the following percentages: 67%, 32% and 31%. In other words, for **every \$1 invested** in the treatment of high-risk Medicaid clients, **67 cents was recouped** in the form of reduced Medicaid costs during the 12 months following treatment. Similarly, for **every \$1 invested** in the treatment of high-risk public assistance clients or high-risk treatment reentry clients, approximately **32 cents was recouped** in the form of reduced welfare or treatment reentry costs.

Some clients had characteristics that defined them as high-risk for more than one category. For these clients, the benefits of treatment relative to costs would be greater. Approximately 17% of the clients were hard-drug users on AFDC. The economic benefits of treatment for these clients would be in the form of both reduced Medicaid costs and decreased welfare payments. Adding the benefit values for these two expense categories together yields an estimated combined benefit of \$1,803 (\$1,304 + \$499). This figure can be compared to an average cost figure of \$1,740, which would represent the estimated incremental treatment costs for high-risk Medicaid and public assistance clients [$\$1,740 = (\$1,940 + \$1,540)/2$]. This yields a benefit-cost ratio of 1.04. Thus, for every **\$1 invested** in the treatment of a hard drug user on AFDC, **\$1.04 would be recouped** in the form of reduced Medicaid costs and welfare expenditures during the 12 months following treatment.

CONCLUSION

Substance abuse continues to pose major challenges for society. Although the costs of treatment and prevention efforts compared to the total economic cost of substance abuse (measured in terms of crime, lost productivity, etc.) is minuscule—less than one percent—questions continue to be asked, appropriately, about the effectiveness of these efforts. Governmental agencies responsible for allocating resources directed at the problem of substance abuse need to know what the investment of resources yields. Measuring the effects of treatment in terms of economic benefits compared to costs provides a useful evaluative approach—although its limitations should be understood. There is no doubt that treatment may have very important intangible benefits that defy economic quantification in the short run. Yet these intangible benefits in the form of increased self-esteem and improved coping skills may be the very factors that help clients become drug-free in the longer term.

The results of this analysis suggest that ADATSA treatment does have important short-run economic benefits that compare favorably with the costs of treating clients. Particularly important seems to be the reduction in Medicaid costs associated with treatment. But the study's findings suggest that ADATSA treatment also produces savings in the form of decreased treatment reentry costs.

The combined economic impact of treatment in terms of cost savings for Medicaid, public assistance and treatment reentry translates into a benefit representing 38% of treatment costs. For some clients who may be considered high risk, ADATSA treatment may yield cost savings that represent an even larger economic benefit. There is little doubt the benefits of treatment persist beyond the initial year following treatment, so the benefit-cost calculus of treatment may be even more favorable. ORDA is currently exploring this issue in more depth. Based on the limited cost-benefit analysis reported here, ADATSA treatment appears to yield dividends well worth the modest investment of state resources.

REFERENCES

1. Wickizer TM, Wagner T, Atherly A, Beck. Economic Costs of Drug and Alcohol Abuse in Washington State. Division of Alcohol and Substance Abuse, Olympia, WA, 1994.
2. Center for Alcohol Studies Rutgers University. Socioeconomic Evaluations of Addictions Treatment, Piscataway, NJ, 1993.
3. Longhi D, Brown M, Comtois R. ADATSA Treatment Outcomes: Employment and Cost Avoidance: An Eighteen Month Follow-Up Study of Indigent Persons Served by Washington State's Alcoholism and Drug Addiction Treatment and Support Act. Office of Research and Data Analysis, DSHS, Olympia, WA, 1994.
4. Anglin MD, Hser YI. The treatment of drug abuse. In Tonry M & Wilson JQ (Eds.), Drugs and Crime. Chicago:University of Chicago Press, 393-460, 1990.
5. Office of Drug Control Policy. Understanding drug treatment. Washington, DC: U.S. Government Printing Office, 1990.
6. Institute of Medicine. Treating Drug Problems. Washington, DC: National Academy Press, 1990.
7. Institute of Medicine. Broadening the Base of Treatment for Alcohol Problems. Washington, D.C: National Academy Press, 1990.
8. Rundell OH, Paredes A. Benefit-cost methodology in the evaluation of therapeutic services for alcoholism. *Alcoholism: Clinical and Experimental Research* 1979; 3:324-333.
9. National Institute on Alcohol Abuse and Alcoholism. Benefit-cost analysis of alcoholism treatment centers. NIAAA Publ. No. (ADM) 281-75-0031. Washington, DC: U.S. Government Printing Office, 1976.
10. Jones K, Vischi T. Impact of alcohol, drug abuse and mental health treatment on medical care utilization. *Medical Care* 1979;17(Suppl. No. 12):1-82.
11. Holder HD. Alcoholism treatment and potential health care cost savings. *Medical Care* 1987; 25:52-71.

12. Plotnick DE, Adams KM, Hunter HR, Rowe JC. Alcoholism treatment programs within prepaid group practice HMOs: A final report. Washington, DC: Group Health Association of America, 1982.
13. Becker FW, Sanders BK. The Illinois Medicare/Medicaid Alcoholism Services Demonstration: Medicaid cost trends and utilization patterns—managerial report. Center for Policy Studies and Program Evaluation, Sangamon State University, 1984.
14. National Institute on Alcohol Abuse and Alcoholism. Alcoholism treatment impact on total health care utilization and costs: analysis of the federal employee health benefit program with Aetna Life Insurance Company. Rockville, MD: U.S. Department of Health and Human Services, 1985.
15. Holder HD, Blose JO. Alcoholism treatment and total health care utilization and costs. *Journal of the American Medical Association* 1986; 256:1456-1460.
16. Sells SB, Ed. Effectiveness of drug abuse treatment. Vols. 1 and 2. Cambridge, MA: Ballinger, 1974
17. Simpson DD, Joe GW, Lehman W, Sells SB. Addiction careers: Etiology, treatment, and 12-year follow-up outcomes. *Journal of Drug Issues* 1986; 16:107-122.
18. Simpson DD. The relation of time spent in drug abuse treatment to posttreatment outcome. *American Journal of Psychiatry* 1979; 136:1449-1453.
19. Simpson DD, Friend HJ. Legal status and long-term outcomes for addicts in the DARP followup project. In Leukefeld, CG & Tims FM (eds.), Compulsory Treatment of Drug Abuse: Research and Practice, pp. 81-98. NIDA Research Monograph No. 86. Rockville, MD: U.S. Department of Health and Human Services, 1991.
20. Simpson DD, Sells SB. Evaluation of drug abuse treatment effectiveness: Summary of the DARP follow-up research. National Institute on Drug Abuse Treatment Research Report. DHHS Publ. No. (ADM)82-1209. Washington, DC: U.S. Government Printing Office, 1983.
21. Hubbard RL, Marsden ME, Rachal JV, Harwood HJ, Cavanaugh ER, Ginzburg HM. Drug abuse treatment: a national study of effectiveness. Chapel Hill, NC: University of North Carolina Press, 1989.

22. Harwood HJ, Hubbard RL, Collins JJ, Rachal JV. The costs of crime and the benefits of drug abuse treatment: a cost-benefit analysis using TOPS data. In Leukefeld, CG & Tims FM (eds.), Compulsory Treatment of Drug Abuse: Research and Practice, pp. 81-98. NIDA Research Monograph No. 86. Rockville, MD: U.S. Department of Health and Human Services, 1991.
23. Gerstein DR, Johnson RA, Harwood HJ, et al. Evaluating Recovery Services: The California Drug and Alcohol Treatment Assessment (CALDATA) Report, Department of Alcohol and Drug Programs, Sacramento, CA, 1994.
24. Finigan M. Societal Outcomes and Cost Savings of Drug and Alcohol Treatment in the State of Oregon, Office of Alcohol and Drug Abuse Programs, Oregon Department of Human Resources, Salem, Oregon, 1996.
25. Luxenberg MG, Christenson M, Betzner AE, et al. Chemical Dependency Treatment Programs in Minnesota: Treatment Effectiveness and Cost Offset Analysis. Minnesota Department of Human Services, St. Paul, MN, 1996.

